

## HYPERTENSIVE DISORDERS OF PREGNANCY: FREQUENCY, MATERNAL AND FETAL OUTCOMES

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### ABSTRACT

**Objectives:** To determine the frequency and distribution of different types of hypertensive disorders of pregnancy and to determine the impact of hypertensive disorders of pregnancy (HDP) on maternal and fetal outcomes.

**Study Design:** A descriptive retrospective study.

**Place and Duration of Study:** The study was conducted in the department of Gynaecology and Obstetric of Isra University Hospital Hyderabad from January to December 2007.

**Patients and Methods:** All the patients who were diagnosed to have hypertensive disorders of pregnancy during study period were categorized as group I. One hundred nineteen women delivered during the same period without hypertensive disorders of pregnancy were included as group II. The data regarding demographic and obstetrical parameters, associated risk factors, fetal and maternal complications were gathered from available data on medical record files. Total number of deliveries during the same period was obtained.

Frequency of hypertensive disorders of pregnancy was calculated. Statistical analysis was performed by SPSS V11. Pearson's chi square and student's t test was used for comparison of variables in between two groups. P value < 0.05 was considered significant.

**Results:** The frequency of Hypertensive disorders of pregnancy was 8.9% in our study. The mean maternal age was 28.57±5.8 years and 26.56±5.0 years for group I and II respectively. Forty eight (76.2%) of group I patients were Unbooked for antenatal care, 37(58.7%) belonged to poor socioeconomic status and 82(45.1%) were multipara. Statistically significant difference was found for antenatal booking status (P. 0.04) and socioeconomic status (P. 0.01) and parity (P 0.04) in both groups. Twenty three (36.5%) patients from group I had past history of hypertensive disorders of pregnancy, while it was reported only by 8(6.7%) of group II patients. It was observed that women with HDP have strong family history of hypertension (P. <0.001). Regarding maternal outcome more patients from group I were shifted to ICU as compared to group II. Maternal mortality was significantly high in group I (P <0.001).

The mean gestational age was 35.29±2.6 weeks and 38.03±1.3 weeks in group I and II respectively. The mean birth weight of baby was 2.5±0.73 kilograms and 2.8±0.41kilograms in group I and II respectively. Statistically significant difference was observed in both groups for mean gestational age (P<0.001) and mean birth weight of baby (P<0.001).

Statistically significant difference was observed for Preterm birth, Still born, Neonatal death and admission of newborn in neonatal intensive care unit (P <0.001), (P <0.001), (P <0.001), (P<0.001) respectively. The Perinatal mortality was 230/1000 births in group I, while it was 40/1000 in group II.

**Conclusion:** Frequency of HDP is high in our set up. It is associated with high maternal and perinatal morbidity and mortality.

**Keywords:** Hypertensive disorders, Maternal, Fetal, outcome.

### INTRODUCTION

Every year nearly 5, 29,000 women die globally due to pregnancy related causes. For

each death nearly 118 women suffer from life threatening events or severe acute morbidity [1].

Hypertensive disorders of pregnancy seems to be one of the major causes of maternal morbidity and mortality leading to 10-15% of maternal deaths specially in developing world [2].

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World Health Organization estimates that at least one woman dies every seven minutes from complications of hypertensive disorders of pregnancy [3].

Pregnancies complicated with hypertensive disorders are associated with increase risk of adverse fetal, neonatal and maternal outcome including preterm birth, intrauterine growth retardation (IUGR), Perinatal death, Ante partum hemorrhage, postpartum hemorrhage and maternal death [4, 5]. Moreover the disease not only affects pregnancy outcome but also predisposes mother and child to long term health complications like cardiovascular diseases [6].

Five classes of hypertensive disorders were identified according to the latest classification system described by National High Blood Pressure Education Working group (2000) including Preeclampsia, Eclampsia, Transient Hypertension of pregnancy, chronic hypertension and Preeclampsia superimposed on chronic hypertension [4].

Differentiating between these groups is mandatory regarding the determination of best management strategies.

Approximately 30% of hypertensive disorders of pregnancy were due to chronic hypertension while 70% of the cases were diagnosed as gestational hypertension/Preeclampsia [7].

The incidence and prevalence of hypertensive disorders of pregnancy vary from one country to another and might have some genetic predisposition. These disorders account 6.4% of deliveries in African Americans and 4.8% in other women in United States of America [8]. Prevalence in North West Saudi Arabia was 3/100 deliveries [9], it was 7.49 in India [10].

Literature review reveals that there is much work done on this subject in Western world there were very few research studies done in South East Asia region especially in Pakistan which are derisory as compare to burden of this disease and with high rate of maternal and fetal morbidities and mortalities

The aim of this research study was to determine the frequency and distribution of

different types of hypertensive disorders of pregnancy, and to determine the impact of this potentially devastating disorder on maternal and fetal outcome at Isra University Hospital Hyderabad Sindh Pakistan.

## **PATIENTS AND METHODS**

A descriptive retrospective study was undertaken reviewing the medical records of the patients, who were managed at Isra University hospital in the department of Obstetrics and Gynecology between the period of 1st January to 31st December in 2007. Isra University Hospital is one of the big private sector hospital in Hyderabad Sindh. Hospital caters patients from Hyderabad city and from nearby villages.

During the twelve months study period total 708 women were delivered, out of them 63 were diagnosed as a case of hypertensive disorders of pregnancy (HDP) and categorized as group I.

One hundred nineteen women without HDP were selected by simple random selection from remaining patient's record files and categorized as group II. Women with missing or unavailable data, with other medical disorders like diabetes Mellitus and Cardiac disease were excluded from study.

The diagnosis of hypertension was based on the criteria defined by National High Blood pressure Education Programme Working Group on high blood pressure in pregnancy [4].

All the patients who have were found to have systolic blood pressure  $\geq 140$  mmHg and diastolic blood pressure  $\geq 90$  mmHg after 20 weeks of pregnancy were included in the study and suggested as patient of pregnancy induced hypertension (PIH), while all those patients who gave history of raised blood pressure prior to 20 weeks of gestation or those taking treatment for control of blood pressure prior to 20 weeks of pregnancy were assumed to be chronically hypertensive. Patients with pregestational chronic hypertension who were taking treatment were also included irrespective of their blood pressure reading at the time of admission.

Data regarding the demographic parameters, gestational age (determined by last

menstrual period or 1st trimester ultrasound), associated medical disorders such as diabetes, past history of hypertension, family history of hypertension and diabetes mellitus, obstetric problems involving preterm labour and maternal and fetal complications like maternal death, fetal death were gathered from the available data on medical record files.

The total number of deliveries during the same period was obtained from hospital discharge survey.

The frequency of hypertensive disorders was calculated. Perinatal mortality was defined as fetus born (still birth) plus neonates who died within 28 days of life /1000 total births [11, 12] Still birth was defined as the absence of sign of life in a baby born with weight of about 500gm or after 22 weeks of gestation [11, 12]

Statistical comparison of clinical and demographic factors between group I and II was carried out by Pearson's chi square test and student's t test. P value less than 0.05 was considered statistically significant.

## RESULTS

There were total of 708 deliveries during study period and 63 patients have fulfilled the entry criteria for hypertensive disorders of pregnancy. The frequency of HDP was 8.9%.

The mean maternal age was  $28.57 \pm 5.8$  years and  $26.56 \pm 5.0$  years for group I and II respectively.

Forty eight (76.2%) of group I patients and 73(61.3%) of group II were Unbooked for antenatal care. Thirty Seven (58.7%) and 46(38.7%) belongs to poor socioeconomic status from group I and II respectively. Statistically significant difference was found for antenatal booking status (P. 0.04) and socioeconomic status (P. 0.01) in both groups.

One hundred seventy one patients did not gave history of previous abortion, while 7 (11.1%) and Two (3.2%) of group I and II respectively reported the 1-2 abortion in their past obstetrics history. statistically significant difference was found in group I and II (p. 0.003) regarding the history of previous abortion. (Table-1)

The distribution of different hypertensive disorders of pregnancy was that, Transient hypertension of pregnancy was diagnosed in 38(60.3%) cases. 8(12.7%) and 6(9.5%) patients appear to be pre-eclamptic and eclamptic respectively. Chronic hypertension was found in six (9.5%) patients and 5 (7.9%) patients were having superimposed Preeclampsia on chronic hypertension.

Twin pregnancy was diagnosed in 2(3.2%) and 4(3.4%) for group I and II respectively.

Eighteen (28.6%) patients from group I gave history of PIH in their past pregnancy, 4(6.4%) and 1 (1.6%) patients have past history of Preeclampsia and Eclampsia respectively. Only 8(6.7%) of group II patients reported HDP during their past pregnancies. It has been also observed that the women having HDP have strong family history of hypertension (P <0.001) and diabetes mellitus (P 0.005).

Delivery route was abdominal in 42 (66.6%) of group I patients and vaginal in 94 (79%) of group II patients (P 0.001).

Maternal and fetal outcome are shown in table 2 and 3.

Eleven (17.5%) of group I patients were shifted to ICU, while very few 2 (1.7%) of group II required ICU admission. Maternal mortality occurred in 2 (3.2%) group I patients. No maternal death occurred in group II patients (P <0.001).

The mean gestational age was  $35.29 \pm 2.6$  weeks and  $38.03 \pm 1.3$  weeks in group I and II respectively. The mean birth weight of baby was  $2.5 \pm 0.73$  kilograms and  $2.8 \pm 0.41$  kilograms in group I and II respectively. Statistically significant difference was observed in both groups for mean gestational age (P<0.001) and mean birth weight of baby (P<0.001).

Intrauterine growth restriction was found more in group I, 16(24.6%) as compared to group II. Statistically significant difference was observed for Preterm birth, Still born, Neonatal death and admission of newborn in neonatal intensive care unit (P <0.001), (P <0.001), (P <0.001), (P <0.001) respectively. The Perinatal mortality was 230/1000 births in group I, while it was 40/1000 in group II.

**Table-1: Sociodemographic and Maternal Reproductive characteristics**

Variables	Cases(n=63)	Control(n=119)	P Value
<b>Maternal age in years</b>			
18-18	23(36.5)	51(42.9)	NS*
29-39	38(60.3)	66(55.5)	
>39	2(3.2)	2(1.7)	
<b>Occupation</b>			
Housewife	61(96.8)	111(93.3)	NS*
Doctor	1(1.6)	2(1.7)	
Teacher	1(1.6)	4(3.4)	
Lady Health worker	0	2(1.70)	
<b>Locality</b>			
Urban	28(44.4)	68(57.1)	NS*
Rural	35(55.6)	51(42.9)	
<b>Parity</b>			
Primipara	18(28.6)	54(45.4)	0.044
Multipara	31(49.2)	51(42.9)	
Grandmultipara	14(22.2)	14(11.8)	
<b>Status of Antenatal care</b>			
Booked	15(23.8)	46(38.7)	0.004
Unbooked	48(76.2)	73(61.3)	
<b>Socioeconomic status</b>			
Poor	37(58.7)	46(38.7)	0.017
Middle Class	22(34.9)	68(57.1)	
Upper Class	4(6.3)	5(4.2)	
<b>Gestational age in weeks</b>			
29-37	41(65.1)	9(7.6)	<0.001
37-40	21(33.3)	105(88.2)	
>40	1(1.6)	5(4.2)	
<b>Chronic hypertension</b>			
Yes	6(9.5)	2(1.7)	0.021
No	57(90.5)	117(98.3)	
<b>Previous history of HDP</b>			
Yes	22(34.9)	8(6.7)	<0.001
No	41(65.1)	111(93.3)	
<b>Family history of Hypertension</b>			
Yes	35(55.6)	19(16)	<0.001
No	28(44.4)	100(84)	
<b>Previous history of abortion</b>			
0	54(85.7)	117(98.3)	0.003
1-2	7(11.1)	2(1.7)	
>2	2(3.2)	0	

Results are expressed as number and percentages

\* Not significant

## DISCUSSION

Hypertensive disorders of pregnancy are considered to be a major world wide health problem running an increased risk of Perinatal and maternal mortality [13]. The prevalence of HDP varies according to geographic regions of world and ranges from 1.5% in Sweden to 7.5% in Brazil [14]. Some studies from Saudi Arabia reported prevalence between 2.6% and 3.7% [9] while Venture determine a prevalence of 3.8% in USA in 2000 [15]. The incidence reported from Turkey was 8.49% [16].

According to our study the frequency of hypertensive disorders of pregnancy was 8.9%. The variations can be attributed to racial differences, socioeconomic status and some other parameters like parity and age. Somewhat higher frequency in our study can be attributed to the fact that the patients coming to our hospital were unbooked and referral from some primary care unit/ private clinic.

We determined the different classes of Hypertensive disorders of pregnancy and found that transient hypertension of pregnancy

**Table-2: Maternal Outcome.**

Maternal Outcome	Cases (n=63)	Control (n=119)	P Value
<b>Mode of Delivery</b>			
Cesarean section	42(66.6)	25(21)	<0.001
Normal Vaginal delivery	21(33.3)	94(79)	
<b>Ante partum Hemorrhage due to abruptio Placenta</b>			
Yes	2(3.2)	3(2.5)	NS*
No	61(96.8)	116(97.5)	
<b>Postpartum hemorrhage</b>			
Yes	5(7.9)	3(2.5)	NS*
No	58(92.1)	116(97.5)	
<b>Shifted to ICU</b>			
Yes	11(17.7)	2(1.7)	<0.001
No	52(82.5)	117(98.3)	
<b>Hellp** Syndrome</b>			
Yes	1(1.6)	0	NS*
No	62(98.4)	119(100)	
<b>Maternal Death</b>			
Yes	2(3.2)	119(100)	0.051
No	61(96.8)	0	

Results are expressed as number and percentage

\*Not Significant

\*\* Hemolytic anemia, Elevated Liver enzymes and Low Platelet count

**Table-3: Fetal Outcome**

Fetal Outcome	Case(n=65)	Control(n=123)	P value
<b>IUGR</b>			
Yes	16(24.6)	3(2.5)	<0.001
No	49(75.4)	120(97.5)	
<b>Preterm Birth</b>			
Yes	49(75.4)	13(10.5)	<0.001
No	16(24.6)	110(89.5)	
<b>Still Born</b>			
Yes	9(13.8)	2(1.6)	0.001
No	56(86.2)	121(98.4)	
<b>Neonatal death</b>			
Yes	6(9.2)	2(1.6)	0.014
No	59(90.8)	121(98.4)	
<b>Shifted to NICU</b>			
Yes	29(44.6)	7(5.6)	<0.001
No	36(55.4)	116(94.4)	

Results are expressed as number and percentage

contributed to the bulk of sample surveyed, it meant that Preeclampsia, Eclampsia and Transient hypertension (PET) of pregnancy accounted for 92% of total hypertensive pregnancies which make 8.2% of deliveries.

The frequency of Preeclampsia/ Eclampsia was 5.4 % and 2.6 17 .It was 4.34 % in Turkey [16]. In our study frequency of PET/Eclampsia

was 1.97%, somewhat low than the reported frequencies from literature this may be due to the small sample size and small period of study. We determined the frequency of Eclampsia 0.85% of total deliveries in the study period which was different from the reported incidence from the literature 0.66%, 0.056% and 0.45% [9, 16, 17] this may be due to poor antenatal care and delay in diagnosis of PET as most of our patients were unbooked cases for antenatal care.

Regarding the impact of demographic factors and obstetrics history, we did not found any significant association of maternal age and hypertensive disorders of pregnancy, however literature have shown that young maternal age is the risk factor for HDP [17-19]. Similarly the increase risk of HDP associated with low parity was not consistent with literature [17-19] as majority of study cohort of group I were Multipara of age 29-39 years, this may be secondary to the increase of sclerotic lesions in the myometrial arteries of this age group of women in comparison with young women.

It was observed in our study that the HDP were significantly high in women with lower socioeconomic status having poor excess to antenatal care. This is consistent with the literature [16 -19].

Previous history of miscarriage was significantly high in women with HDP, same was observed by some authors [20] but not by others [19].

Pregnancy may have detrimental effect on existing Hypertension. Development of Preeclampsia and Eclampsia was found to be four times higher in patients with chronic hypertension preceding pregnancy [8]. Like previous studies we have found that chronic hypertension is significantly associated with HDP [21].

We have observed that HDP was significantly high in women with previous history of HDP and family history of hypertension, same observation was reported in literature [22].

Operative delivery is reported to be increased in hypertensive disorders of pregnancies [23].



In our study delivery route did not differ from the literature.

Various studies show that hypertensive disorders of the pregnancy were associated with increased maternal and perinatal morbidity and mortality [24].

Maternal death in our study was due to increased bleeding due to hepatic syndrome, similar to reported study from Turkey [16]. Irregular or absent antenatal visit, late admission to medical facilities and improper anticonvulsants prophylaxis at primary care centre were the characteristics of patients that demonstrated the clinical criteria for PET/Eclampsia and Hepatic syndrome, the end of the disease spectrum.

Fetal complications associated with hypertensive disorders of pregnancy were intrauterine growth restriction, preterm delivery and requirement of neonatal intensive care unit. Obviously IUGR and preterm birth of fetus carry high risk of early neonatal death due to complications of prematurity. Different Perinatal mortality was presented in literature changing in range from 47-370/1,000 births [24].

Our Perinatal mortality rate for group I was found to be 230/1000births which can be considered as very high in comparison to women without HDP.

## CONCLUSION

We conclude that frequency of hypertensive disorders of pregnancy is high in our set up.

The disorder is associated with high maternal and perinatal morbidity and mortality. The devastating effects of the condition could be prevented with close antenatal follow up.

Further prospective studies from different areas in the country are needed to establish the frequency, clinical pattern and impact of this disorder to guide health care providers.

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